

## CLAIMS

What is claimed is:

- 1 1. A method for managing a memory system having a plurality of subsystems,  
2 comprising the steps of:  
3 upon accessing the subsystems for a piece of data used by a first process,  
4 determining the access time to acquire the piece of data in the  
5 memory system;  
6 comparing the determined access time to a threshold; and  
7 taking an action based on the results of the comparing step;  
8 wherein accessing the subsystems is in a non-sequential order.
- 1 2. The method of claim 1 wherein data blocks containing the piece of data is placed  
2 in the memory system based on information selected in one or a combination of:  
3 a movement pattern of data in a data block,  
4 a structure of the memory system, and  
5 a cache-level architecture in the memory system.
- 1 3. The method of claim 1 further comprising the steps of:  
2 using a memory table having entries pointing to data blocks storing data  
3 for at least one subsystem; and  
4 using the entries to locate the access data.
- 1 4. The method of claim 3 wherein the memory table working with a memory  
2 manager managing the data blocks independent of an operating system working  
3 with the memory system and independent of a processor working with the memory  
4 system.

- 1     5.     The method of claim 1 further comprising the steps of:  
2             using a memory table having entries pointing to data blocks storing data  
3             for the memory system; and  
4             the memory table using a physical address of a memory page  
5             corresponding to the piece of access data to convert to a location  
6             address corresponding to an entry pointing to the location of the  
7             piece of access data.
- 1     6.     A method for managing a memory system, comprising the steps of:  
2             upon accessing the memory system for a piece of data used by a first  
3             process,  
4             a processor working with the memory system continuing its  
5             functions until it is stalled;  
6             comparing the time taken to complete the memory access to a  
7             threshold; and  
8             if the time taken to complete the memory access is close to, equal  
9             to, or greater than the threshold, then taking an action.
- 1     7.     The method of claim 6 wherein the action is selected in one or a combination of  
2             postponing executing the first process and allowing executing a second  
3             process;  
4             causing the first process to be switched to a second process; and  
5             causing a performance monitor on the memory system or on a system using  
6             the memory subsystem.
- 1     8.     The method of claim 6 further comprising the step of polling a latency manager for  
2             the time taken to complete the memory access; the latency manger being part of  
3             managing the memory system.

- 1 9. The method of claim 6 further comprising the steps of:  
2 using a memory table having entries pointing to data blocks storing data  
3 for at least one subsystem; and  
4 using the entries to locate the access data.
- 1 10. The method of claim 9 wherein the memory table working with a memory  
2 manager managing the data blocks independent of a processor working with the  
3 memory system and independent of an operating system working with the memory  
4 system.
- 1 11. A method for managing a memory system, comprising the steps of:  
2 upon accessing the memory system for a piece of data used by a first  
3 process  
4 counting a time elapsed from the time the data access starts; the  
5 counted time being increased as the data is being accessed;  
6 comparing the counted time to a threshold; and  
7 if the counted time is close to, equal to, or greater than the  
8 threshold, then taking an action selected in one or a combination of  
9 postponing executing the first process and allowing  
10 executing a second process;  
11 causing the first process to be switched to a second process;  
12 and  
13 causing a performance monitor on the memory system or on  
14 a system using the memory system.
- 1 12. The method of claim 11 further comprising the steps of:  
2 using a memory table having entries pointing to data blocks storing data  
3 for at least one memory subsystem; and

4 using the entries to locate the access data.

1 13. A computer-readable medium embodying instructions for a computer to perform a  
2 method for managing a memory system having a plurality of subsystems, the  
3 method comprising the steps of:

4 upon accessing the subsystems for a piece of data used by a first process,  
5 determining the access time to acquire the piece of data in the  
6 memory system;  
7 comparing the determined access time to a threshold; and  
8 taking an action based on the results of the comparing step;  
9 wherein accessing the subsystems is in a non-sequential order.

1 14. The computer-readable medium of claim 13 wherein data blocks containing the  
2 piece of data is placed in the memory system based on information selected in one  
3 or a combination of:

4 a movement pattern of data in a data block,  
5 a structure of the memory system, and  
6 a cache-level architecture in the memory system.

1 15. The computer-readable medium of claim 13 wherein the method further  
2 comprising the steps of:

3 using a memory table having entries pointing to data blocks storing data  
4 for at least one subsystem; and  
5 using the entries to locate the access data.

1 16. The computer-readable medium of claim 15 wherein the memory table working  
2 with a memory manager managing the data blocks independent of an operating



1 20. The computer-readable medium of claim 18 wherein the method further comprises  
2 the steps of:

3 using a memory table having entries pointing to data blocks storing data  
4 for at least one subsystem; and  
5 using the entries to locate the access data.

1 21. A computer-readable medium embodying instructions for a computer to perform a  
2 method for managing a memory system, the method comprising the steps of:

3 upon accessing the memory system for a piece of data used by a first  
4 process,  
5 counting a time elapsed from the time the data access starts; the  
6 counted time being increased as the data is being accessed;  
7 comparing the counted time to a threshold, and  
8 if the counted time is close to, equal to, or greater than the  
9 threshold, then taking an action selected in one or a combination of  
10 postponing executing the first process and allowing  
11 executing a second process;  
12 causing the first process to be switched to a second process;  
13 and  
14 causing a performance monitor on the memory system or on  
15 a system using the memory subsystem.

1 22. The computer-readable medium of claim 21 wherein the method further comprises  
2 the steps of:

3 using a memory table having entries pointing to data blocks storing data  
4 for at least one memory subsystem; and  
5 using the entries to locate the access data.

- 1 23. An apparatus for managing a memory system having a plurality of subsystems,  
2 comprising:  
3 means for, upon accessing the subsystems for a piece of data used by a first  
4 process,  
5 determining the access time to acquire the piece of data in the  
6 memory system;  
7 comparing the determined access time to a threshold; and  
8 taking an action based on the results of the comparing step;  
9 wherein accessing the subsystems is in a non-sequential order.
- 1 24. The apparatus of claim 23 wherein data blocks containing the piece of data is  
2 placed in the memory system based on information selected in one or a  
3 combination of:  
4 a movement pattern of data in a data block,  
5 a structure of the memory system, and  
6 a cache-level architecture in the memory system.
- 1 25. The apparatus of claim 23 further comprising a memory table having entries  
2 pointing to data blocks storing data for at least one subsystem; the entries being  
3 used to locate the access data.
- 1 26. The apparatus of claim 25 wherein the memory table working with a memory  
2 manager managing the data blocks independent of an operating system working  
3 with the memory system and independent of a processor working with the memory  
4 system.
- 1 27. The apparatus of claim 23 further comprising a memory table having entries  
2 pointing to data blocks storing data for the memory system; the memory table

3 using a physical address of a memory page corresponding to the piece of access  
4 data to convert to a location address corresponding to an entry pointing to the  
5 location of the piece of access data.

1 28. An apparatus for managing a memory system, comprising:  
2 upon accessing the memory system for a piece of data used by a first  
3 process,  
4 a processor for working with the memory system and for continuing  
5 its functions until it is stalled;  
6 means for comparing the time taken to complete the memory access  
7 to a threshold; and  
8 means for taking an action if the time taken to complete the  
9 memory access is close to, equal to, or greater than the  
10 threshold.

1 29. The apparatus of claim 28 further comprising means for polling a latency manager  
2 for the time taken to complete the memory access; the latency manger being part  
3 of managing the memory system.

1 30. The apparatus of claim 28 further comprising a memory table having entries  
2 pointing to data blocks storing data for at least one subsystem; the entries being  
3 used to locate the access data.

1 31. An apparatus for managing a memory system, comprising:  
2 upon accessing the memory system for a piece of data used by a first  
3 process,



4 means for counting a time elapsed from the time the data access  
5 starts; the counted time being increased as the data is being  
6 accessed;  
7 means for comparing the counted time to a threshold, and  
8 if the counted time is close to, equal to, or greater than the  
9 threshold, means for taking an action selected in one or a  
10 combination of  
11 postponing executing the first process and allowing  
12 executing a second process;  
13 causing the first process to be switched to a second process;  
14 and  
15 causing a performance monitor on the memory system or on  
16 a system using the memory subsystem.

- 1 32. The apparatus of claim 31 further comprising a memory table having entries  
2 pointing to data blocks storing data for at least one memory subsystem; the entries  
3 being used to locate the access data.